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THE CONTROL AND TREATMENT OF CERTAIN FORMS OF MASTITIS*

BY

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Probably no disease has been so widely discussed in the veterinary literature of the last two decades as bovine mastitis, and in all countries where milk production figures largely in the agricultural industry many research workers have focused their attention on its investigation. In this country, it was not until 1927, at a time when diseases of the udder were causing great financial loss to an already depressed dairying industry, that mastitis received serious attention. It would perhaps be difficult to give an accurate estimate of the financial losses caused by this disease and figures quoted by the Survey Committee of the N.V.M.A. in 1941 when a loss of £3,000,000 occurred annually would undoubtedly have to be revised to-day when some advance has been made in controlling one form of the disease, *i.e.*, that due to *Streptococcus agalactiae*. I propose to discuss some of the more recent developments in the control of this form and to consider also the importance of staphylococcal mastitis.

MASTITIS DUE TO *STR. AGALACTIAE*

INCIDENCE

Chronic mastitis caused by *Str. agalactiae* was at one time considered to be the most prevalent form of udder disease and it was generally understood that about 30 per cent. of milking cows were affected and that 70 per cent. of all clinical disease was due to this organism. In 1944, workers published results (Imp. Bur. Anim. Hlth. Rev. Series No. 2), gathered from herds mainly in southern England, showing that 38 per cent. of the cows in 20 herds were infected, while in 1939 Cunningham and his co-workers in Scotland found that 35 per cent. of cows in 11 herds carried *Str. agalactiae*. In 1947, however, the number of clean herds appeared to be already increasing at a time when penicillin therapy was beginning to be widely applied. Thus, in a survey carried out at Compton during 1947–48, of 40 herds examined in the county of Berkshire only 17 were infected with *Str. agalactiae* although the incidence in the infected herds was 30 per cent. At the same time, Hughes (1948) reported that of 19 herds in the N.E. Midland area, three were free from infection and the over-all incidence was 15 per cent. This figure agrees closely with that quoted recently by Wilson (1952) which was obtained by examining 207 herds in Surrey and 125 in Herts. The reduction in the general incidence of infection in the recent surveys cannot be attributed to the assistance of therapeutic measures alone, but possibly to the fact that many farmers turned to milk production during and immediately before the war and that their nucleus herds may have been composed of heifers which under better conditions of dairy hygiene have been maintained free from infection.

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CONTROL BY THERAPEUTIC MEASURES

The confirmatory work reported by Edwards & Brownlee (1946) that the injection of sulphanilamide gave a satisfactory response in curing mastitis due to *Str. agalactiae* gave some encouragement to the development of therapeutic treatment for the individually affected animal. They showed that not only could the organism be eliminated in over 80 per cent. of clinical cases but that recovery of milk yield could be demonstrated in the subsequent lactation if the disease had not advanced beyond the stage of moderate induration of the affected quarter. At the same time they showed that penicillin was equally effective though the dosage employed was limited by the small quantity of this antibiotic then available. Naturally the future of such treatment, which was shown to be devoid of irritation, lay firstly in its application with advantage in the early stages of disease and secondly, for the eventual elimination of infection from carrier cows ; this more widespread application of penicillin therapy, however, had to await the larger production of this antibiotic at reasonable cost.

Although experiments in infected herds reported mainly in this country and in the U.S.A. had shown that it was possible to eliminate *Str. agalactiae* infection by simple hygienic precautions adopted at milking time, it was considered by certain workers in this country (Imp. Bur. Anim. Hlth., 1944) that the successful attempts at eradication were more surprising than the failures in this direction. This pessimistic comment was inspired largely by the fact that *Str. agalactiae* was found by these workers to be widely distributed ; not only was the milk infected but the teat surface, hands of the milkers, cups of the machines and practically everything touched by the milkers' hands during the daily routine harboured infection. Furthermore, Chodkowski (1949) showed that the organism could survive in these sites for at least 21 days. It would appear from these reports that the elimination of infection from the udder alone by therapy could hardly be expected to lead to the successful eradication of infection from the herd.

The first attempts at eradication by means of penicillin therapy, therefore, proceeded with great caution and, in addition to the injection of the cows' udders, other stringent precautions to destroy extraneous infection were employed. Thus Stableforth and his colleagues (1949), while treating every cow in the herd with penicillin, used as auxiliary measures the thorough disinfection of all the premises, the cow herself and the application of penicillin cream to the milkers' hands, with the result that they eradicated infection from 6 out of 10 herds fairly readily.

Our approach to the problem, however, has been based on the established conception that *Str. agalactiae* is an obligatory parasite and that the main source of infection is the milk of the infected udder. In 1947, therefore, we attempted to eradicate infection from a heavily infected herd by less drastic measures which included the treatment of infected cows only, together with the disinfection of clusters between cows ; no hand stripping was practised and milkers treated their hands with antiseptic cream for a short period before milking. This procedure resulted in a quick reduction of infection, and with the exception of the occurrence of a few infections during the first two years after the adoption of treatment, the herd

has remained free from *Str. agalactiae* for six years. Though the conditions in this herd were good and the hygienic technique rigidly practised, we obtained at this time similar results in three out of five commercial herds where no special precautionary measures were adopted beyond those normally in use for clean milk production. Thus the fear that extraneous reservoirs of infection would prove a serious obstacle to successful elimination of infection was quickly dispelled in our own minds by these early results which showed that this could be achieved without employing measures to destroy infection in all the sites where the organism had been reported to exist.

On the other hand, we have observed in our limited experience that the success obtained in the control and eradication of infection is intimately connected with the milking process in operation in the herd. Thus, in 16 infected herds in which we have employed therapy to combat infection, results were successful in eight herds in which hand stripping was not practised ; in the remaining eight herds which were either hand milked or stripped by hand, infection was not eliminated except in one herd which responded when hand stripping was abandoned. The success attending therapy with penicillin in eliminating infection in machine-milked herds as compared with those where hand milking is practised has also been recently observed by Osborne working in the Bristol V.I.O. province. Thus it is fairly clear that the less the manipulation to which the cows' teats are subjected during milking the better the success in the eradication of infection. One further precaution which was found to assist in the speed with which infection was removed was the use of cloths soaked in a disinfectant solution for the washing of the udders prior to milking. This precaution has been shown by Hughes (1953) to be of major importance in controlling spread of infection and appeared to him to be of greater value than attempts to sterilise milking machine clusters between cows. Indeed, it is very doubtful if this practice is effective in destroying *Str. agalactiae* any more than it accomplishes this in the case of *Staphylococcus aureus*, as has been shown by the recent work of Spencer & Lasmanis (1952).

It can be claimed that penicillin is most effective in eliminating streptococcal infection and that about 90 per cent. of infected cows respond successfully to treatment with two doses of 100,000 units at 48- to 96-hour intervals. The response obtained, however, varies considerably in different herds and it may be as low as 50 per cent. In such herds, moreover, there is usually a factor, such as defective hygiene, complicating the success of treatment and, in addition, cows which retain infection are usually affected with teat sores which may be a prevalent condition in the herd. Thus I have known individual cows of this kind which have failed six courses of treatment and no doubt failure is due to rapid reinfection in these cases. The resistance to treatment of cows affected with teat lesions has been observed on several occasions by different workers and Chodkowski (1949) has demonstrated that 60 to 80 per cent. of cows with sore teats harbour the organism whereas only 15 to 17 per cent. of those with clean teats carry it. It is well established that such lesions, especially if they consist of deep fissures of the teat orifice do predispose to infection of the udder (Stuart & Lancaster, 1949).

Occasionally, cows which are genuinely refractory to repeated treatment are encountered as single cases in herds that otherwise respond well to treatment. It is not easy to account for the persistence of infection in these cases since the organism is quite sensitive to penicillin and close study of the glandular structure of such cows might throw more light on its cause.

Procedure Suggested for the Control of *Str. agalactiae*

It is not easy to make recommendations regarding a routine procedure for adoption in a campaign against *Str. agalactiae* infection, since different methods have been used by different workers. Obviously any recommendation made should take into consideration the following facts : (*a*) The examinations of the herd must be reduced to a minimum ; (*b*) the daily routine recommended must not be too exhaustive a ritual for the milkers ; (*c*) the costs involved must not be excessive, bearing in mind that laboratory aid must be enlisted in addition to the time of the practitioner.

The recommendations I would make are as follows :—

(1) Sample the herd on two occasions at weekly intervals for bacteriological examination of composite milk samples of each cow.

(2) Treat the infected cows and dry cows with two injections at three-day intervals of 100,000 units of penicillin in all quarters and apply antiseptic cream, such as one containing cetavlon, to milkers' hands, before milking, for a week.

(3) Dispense with hand stripping and use separate sterile cloths for washing the udders of each cow with a suitable disinfectant immediately before milking.

(4) Retest the herd in six weeks and retreat all infected cows.

(5) A further test at 12 weeks should be carried out and if infection is absent there is no particular reason for continuing with disinfectants in the washing water.

(6) Further tests can be carried out and may be spaced at longer intervals up to six months. Cows which resist two treatments should be examined carefully for lesions involving the teat ; fissures should be treated with a non-oily antiseptic ointment. If after further treatment infection is still present consideration should be given to the elimination of such cows from the herd.

It is preferable to begin the programme in the early summer when fewer cows are dry and when the condition of the teats of outwintered cows is improved. Our experience of the time for which herds may be expected to remain free from *Str. agalactiae* is rather limited, but knowledge on this point is being gathered at various research centres. Occasionally it is known that breakdowns have occurred and while no distinct proof exists as to how new infection in clean herds arises, there is, in my experience, strong suspicion that it may be due either to the casual introduction of a milker from an infected herd belonging to the same owner or to the purchase of an infected cow.

Effect of Herd Treatment

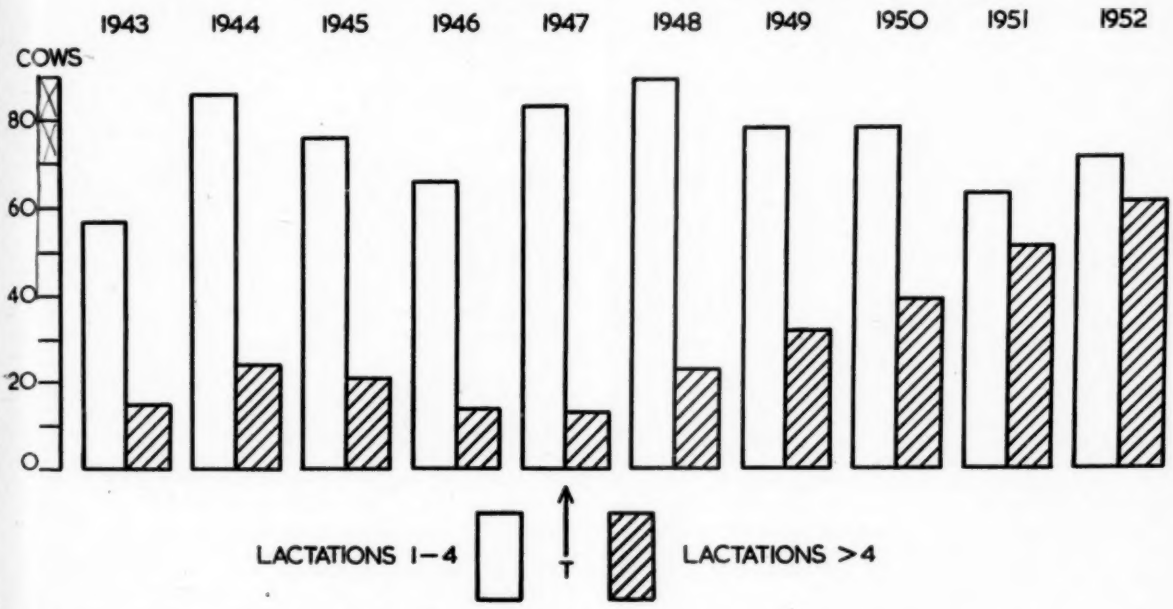
While a great deal of work has been carried out on the efficiency of penicillin in the elimination of infection, little attention has been paid to the benefits, if any, of therapy on the quantity of milk excreted—which, of course, is the *raison d'être* of therapy.

It is not easy to draw conclusions regarding the beneficial effect of mass therapy in individual herds since many factors, such as the management and feeding of the herd, may play a part in influencing milk yield. In our early work at Compton we studied this aspect and found that, in the individual cow, the yields of affected quarters were not influenced during the current lactation but that, following regenerative changes in the udder tissue during the dry period, increased milk yields were subsequently observed, especially when the degree of fibrosis present was not too extensive ; Crossman *et al.* (1950) have confirmed these findings. It follows from this that in the treated herd no spectacular increase in the daily records of individual cows will be observed immediately and that

the beneficial results must be gauged by the lactation records over one or two subsequent years.

Wilson (1952) has observed an increased average milk yield in one herd resulting from treatment and we have observed the same effect in a herd in which infection was eliminated in 1947. While the average lactation yield per cow in this herd has improved steadily from 600 gallons in 1947 to 800 in 1952, the most significant result following the control of mastitis in the herd has been the extended productive life of the cows. This is shown in the accompanying figure in which the number of cows having less than four and more than four lactations in each succeeding year is arranged. Whereas only about 20 per cent. of cows in the herd were retained beyond the fourth lactation in the years before treatment in 1947, in succeeding years this figure has gradually increased until in 1951–52 it was 45 per cent. and a fair number of cows were being kept in their ninth lactation. It must be admitted, however, that this extension of the productive life of the cows in this herd has not been due solely to the elimination of *Str. agalactiae* but also to a concurrent use of therapy for other forms of mastitis and particularly that due to staphylococci.

Showing the extension in the age of cows in a herd following the application of therapy in 1947.



MASTITIS DUE TO STAPHYLOCOCCI

The control of mastitis due to *Str. agalactiae* has rightly received major attention during recent years because evidence was available that this organism was most commonly isolated from clinical cases of disease. Recent unpublished surveys, however, have shown that while *Str. agalactiae* is still an important cause, other organisms have assumed an even greater rôle as a cause of clinical disease and most noticeable in this respect are the staphylococci. It is not easy to account for this change in the incidence of pathogenic organisms since in most herds therapy has not been employed so extensively as to affect the general bacterial flora of the herd.

The disease resulting from staphylococcal infection of the udder may be acute, subacute, or chronic—the last mentioned resembling closely the chronic disease due to streptococcal infection. The acute form of disease, in my experience, usually occurs at calving and leads to gangrenous changes in the udder as well as to constitutional symptoms. The subacute form also occurs chiefly at the time of calving when the udder may be swollen and indurated, the milk abnormal and the milk yield considerably reduced. Staphylococci are more commonly associated with a chronic or latent form of disease and obvious changes in the milk are only evident following a change in milking technique resulting in inefficient milking. The character of the milk in such cases may be abnormal in one or more quarters which, in old-standing cases, become atrophied and indurated as fibrosis develops. Because of the variation in the clinical manifestations of this infection, it might be suspected that the staphylococci responsible were different in character, but at present there is nothing to confirm this even by the phage typing of strains.

In 925 cows belonging to 29 herds examined by us during 1948–52, 10 per cent. showed a subacute mastitis due to staphylococci and only 1 per cent. the acute form. The average infection rate in these herds was 27 per cent., but there was a wide variation—from 3 to 50 per cent.—in incidence.

Treatment

From the literature it appears that staphylococcal mastitis does not respond well to penicillin therapy and that the organism persists in the udder in spite of repeated treatment. It can be understood that in the case of the acute form of the disease the local changes occur so rapidly and may be so advanced that no hopeful clinical recovery can be effected, but in the more common subacute and chronic disease it would be of great value to possess some form of effective therapy. The reported failure of penicillin is not easy to understand since staphylococci are just as sensitive to its action as are the streptococci and there is no reason at present to think that the organism penetrates mammary tissue any more than the streptococci, except possibly for a short duration.

We have found that for the routine treatment of subacute and chronic cases of staphylococcal mastitis in the herd, penicillin effects a satisfactory clinical response. But following the injection of four doses of 100,000 units at two-day intervals we also find that, while the organism is removed from the milk for a short interval, it reappears in a majority of treated quarters at 21 days. It should be explained, however, that while this result confirms the findings of other workers, the trial was conducted in a heavily infected herd in which, although clusters were sterilised in hypochlorite solution between each cow, there is every reason to suppose that the appearance of the organism may have been due to reinfection.

In order to allow the results of therapy to be assessed in a manner which is not complicated by rapid reinfection we have attempted lately to assess the value of various antibiotics under conditions designed to eliminate this factor by maintaining treated cows in isolation where they can be milked with individual units newly sterilised by steaming.

The general method adopted for choosing antibiotics for treatment of specific infections is usually based on their potency against the organism *in vitro*. We have found this method to be reasonably useful for making a broad selection of antibiotics but the final selection should be made by preliminary protection trials in mice. In the case of pathogenic staphylococci penicillin, aureomycin and streptomycin are about equally effective in preventing fatal infection in the mouse and for this reason we have confined our work in the treatment of staphylococcal mastitis to these three antibiotics.

Under the conditions of these experiments we have found that the results largely confirm the *in vivo* protective value in mice since dosages which maintain a concentration for eight days in the milk eliminate staphylococci in about 80 per cent. of treated quarters in the case of each antibiotic. Failures in treatment occurred in the case of old cows, especially in those with induration of the affected quarters. It appears, therefore, at the moment that there is no antibiotic superior to penicillin for the treatment of staphylococcal infection and that four injections at 48-hour intervals will effect recovery in most cases of subacute and chronic affections. The maintenance of cows free from infection is, however, a difficult matter and probably cannot be achieved unless a policy of elimination on the lines adopted for *Str. agalactiae* infection is put into practice. No experimental work on this problem has so far been undertaken so that, in the meantime, the campaign against staphylococci must be limited to the treatment of individual cases.

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Discussion

Dr. P. S. Blackburn, who opened the discussion, said that Dr. Edwards had done an enormous amount of work on the subject of mastitis, and it had been a privilege to listen to him that day. The value of penicillin and other antibiotics in the treatment of clinical mastitis was well known, but less was known generally about their use in the elimination of mastitis organisms from herds. The scheme given for the elimination of *Str. agalactiae* from a herd was welcome, and if the one or two cows which were resistant to treatment were eliminated and all safeguards to prevent reintroduction of the organisms to the byre were rigidly applied, it would be successful. If new cows had to be bought, they should be treated as soon as they came into the herd, but the buying-in of cows should be avoided if possible.

Stuart & Lancaster (1951, *Vet. Rec.*, **61,** 141) found that quarters once infected were susceptible to reinfection with *Str. agalactiae*. It was possible, however, that any quarter cleared of infection was susceptible to reinfection by the same or any other organism, at least during the same lactation.

Before speaking about refractory quarters, *i.e.*, quarters in which organisms, sensitive to a drug, reappeared soon after treatment, Dr. Blackburn discussed the lesions in mastitis. The earliest lesion in a lactating udder consisted of an acute cellular exudate into the acini of a lobule, and affected lobules were found in various parts of the quarter. The affected lobules started to involute, undergoing post-inflammatory involution, the secreting epithelium being cast off. Fresh lobules became affected which in turn involuted. Later the ducts draining the inflamed areas became affected. With a virulent organism all this might occur in a day or so, but with organisms of low virulence it might be weeks before the ducts became affected, if at all.

The duct lesions consisted of the formation of granulation tissue between the epithelium and the elastic layer, which caused a marked reduction in the lumen of the duct. Such lesions had been found in a refractory quarter and it was possible that in some circumstances they might be responsible for the reappearance of organisms after treatment. The lumen might become too small to allow penetration of milk containing the drug and yet large enough for pus containing organisms to leak in the rest of the quarter. Even without severe duct lesions quarters could be difficult to sterilise, *e.g.*, the quarter which had been affected with sub-clinical mastitis for three or four months. Most of the lobules would have undergone post-inflammatory involution, with only a few lactating lobules around the gland cistern giving milk. The quarter might only be giving about 1 lb. of milk per milking, and in such a quarter there would not be a "continuity of fluid" to allow the drug to penetrate through the whole quarter.

General Discussion

Dr. J. T. Stamp, having congratulated Dr. Edwards on his paper, asked for his reasons in allowing an interval of six weeks between mass treatment and the first post-treatment test. He allowed only two weeks, as he thought that a great deal of spread could occur in six weeks. His practice was to test twice before treatment and every 14 days after until the herd was clear. In this way it was possible to detect refractory animals more quickly. These were usually few in number and were best got rid of, as they were no great financial loss.

From his experience in clearing infection from four to five dozen herds he would say that the treatment of the cows was the important thing. Disinfection of hands, udder cloths, etc., was of little importance. Teat lesions, too, he regarded as of secondary importance; it was possible, by constant treatment, to get rid of udder infection despite the presence of teat lesions.

He felt that Drs. Edwards and Blackburn had laid too much stress on bacteria as the cause of mastitis; they had not distinguished sufficiently between carrier and infected animals.

He wished to ask Dr. Edwards about the increase in milk production following treatment. He and Dr. Cunningham had tried to investigate this aspect but had had great difficulty in getting adequate controls because of the tremendous number of variables influencing the picture. He desired to know how Dr. Edwards had controlled his observations.

He agreed with Dr. Edwards that staphylococcal infection was common and presented a definite clinical problem, especially in herds kept in courts as opposed to byres. He had frequently noticed a drop in the incidence of staphylococcal mastitis after a change of cattleman.

He was interested in Dr. Blackburn's hypothesis that occlusion of the small ductules prevented penicillin getting access to infection. However, he was of the opinion that in cases where treatment had been successful the pathology was the same. Wherein, therefore, lay the difference?

Dr. F. Alexander wished to comment on the apparent anomaly between the *in vivo* and *in vitro* actions of penicillin. A definite pharmacological principle was involved, *viz.*, when a drug was

used we must consider not only the effect of the drug on the animal but also the effect of the animal on the drug. Penicillin was excreted so fast by the renal tubules that the blood concentration might be too low to inhibit the organisms. Dr. Blackburn considered that in animals not responding to udder injection there was a barrier preventing the antibiotic from reaching the organism. Had parenteral injection been tried? This should get the drug in contact with the organism.

Mr. R. F. Hall wished to comment on Dr. Edwards's finding on the increased milk yield following therapy. Was the increase due to the therapy or to other factors? He suggested that improvement in management might be a factor, as he thought that the type of farmer who was willing to undertake mass treatment against mastitis might be the more progressive sort of farmer.

Mr. Hugh Begg agreed with Dr. Edwards about the inadvisability of hand stripping. There was, however, a certain amount of difficulty in getting clients, particularly the older ones, to stop the practice.

He wished to ask Dr. Edwards which method of " drying off " he recommended. This might be of some significance in the causation of summer mastitis. Could Dr. Edwards give any information on the prevention of summer mastitis?

He found a certain amount of difficulty in interpreting the significance of cell counts in reports on milk samples. Could Dr. Edwards give him any help in their interpretation?

With regard to the accessibility of the organisms to penicillin, he had made a frequent practice of adopting intra-parenchymal injection, or direct injection, into the substance of the udder. He knew that research workers were very sceptical about this, but he found it very useful, particularly in the treatment of gangrenous mastitis. It might be that parenteral injection would be just as effective.

Mr. H. M. Wilson congratulated Dr. Edwards on a very interesting paper. He found that it was often remarkably difficult to convince farmers of the benefits to be derived from mastitis control. The speakers had given him a great deal of encouragement in continuing his efforts. He felt that proper attention to the " drying off " process was an important factor in mastitis control. With regard to the use of udder cloths, the provision of individual udder cloths entailed more washing and laundering than was possible on the average farm. He was not sure that he agreed with Dr. Edwards that teat sores were more prevalent during the winter months; in his experience such sores were often aggravated during summer.

It seemed that in herds where *Str. agalactiae* was controlled staphylococcal infections often came up, so that one frequently got herds in which staphylococci were the predominant organisms. On the other hand, the gangrenous type of staphylococcal infection was not now so frequently seen. In the treatment of staphylococcal infections he was not entirely happy with the use of penicillin either alone or in combination with streptomycin. He would like to hear Dr. Edwards's views on the use of sulphathiazole. In the treatment of clinical mastitis did Dr. Edwards think that 100,000 units was the optimum dose?

He did not regard infection with *Str. uberis* and *Str. dysgalactiae* as being of great importance. These infections, however, had a considerable nuisance value as they resulted in a great deal of atrophy in affected quarters. What were Dr. Edwards's views on the prophylaxis and treatment of these infections? He would also like to ask Dr. Edwards for his opinion on the therapy and prophylaxis of *C. pyogenes* mastitis.

Mr. W. I. M. McIntyre asked if Dr. Edwards had any opinion on the relative merits of the procaine and sodium salts of penicillin. He was interested in the development of resistant strains of organisms. Had Dr. Edwards ever recovered from the udder a strain of staphylococcus which was resistant to penicillin *in vitro*? With regard to the accessibility of the organisms to the antibiotic, what were Dr. Edwards's views on the use of penicillin parenterally in the more acute cases? If he might put a cross question to Dr. Alexander—what did he consider was an adequate dosage of penicillin by parenteral injection?

Dr. A. Foggie asked Dr. Edwards whether he had ever actually produced resistant strains by treatment. Had he ever altered the susceptibility of an organism during treatment?

Mr. W. F. Jarrett was interested in the pathology. He agreed with Dr. Blackburn that the lesion was important in carrier animals. He wished to ask both Dr. Edwards and Dr. Blackburn whether they had examined serial sections through the lesion in order to determine its exact nature. It might be that fibrosis played an important part.

Dr. Alexander had suggested that parenteral injection might be successful. He pointed out that it was not successful in the treatment of chronic osteomyelitis in the human.

Dr. Alexander, in reply to Mr. McIntyre, said that he could not help about the dosage of penicillin and referred him to the relevant literature.

Professor W. M. Mitchell wished to raise a small point regarding the use of " Cetavlon " for disinfection of the hands. He had used this product several years ago and had found that, as a result of its defatting properties, it resulted in the development of cracked hands. These cracks could harbour infection and might ultimately be harmful. Had Dr. Edwards studied this aspect?

Mr. E. A. McPherson asked Dr. Edwards if he had encountered teat sores in the Channel Island breeds, particularly Jerseys, which were particularly refractory to treatment. If he had, was there any evidence that mastitis was more persistent in these animals?

The Reply

Dr. Edwards, in reply to some of the points raised in the discussion, said that he was greatly interested in the work presented by Dr. Blackburn, particularly as it was concerned with an attempt to explain the pathology of cases which failed to respond to therapy and further research work along these lines was to be encouraged.

Dr. Stamp had raised doubts about allowing an interval of six weeks between treatment and re-test of the herd and thought that it should be reduced to two weeks. In carrying out extensive control work on herds it was obviously necessary to reduce the work involved to a reasonable compass while yet keeping infection at its minimum by laboratory tests and reinjection of infected cows. The period of two weeks was too short, because, frequently, cows which were refractory to treatment did not reveal organisms at this time in a single milk sample. Furthermore, in Dr. Edwards's experience, infection in herds which were milked by an improved hygienic technique was still reduced to a very low incidence even at 12 weeks following treatment. He agreed with Dr. Stamp and other speakers that it was difficult to obtain figures which genuinely proved the advantage of therapy in the herd in raising the production of milk. In their early work at Compton they had compared the yield of individual quarters of the same cow before and after treatment and were satisfied that following successful therapy the reduced yield of affected quarters could be restored in the next lactation to equal that of normal quarters. Little exact work on the effect of therapy on milk yield had been done and most workers were content to regard successful therapy as the elimination of the causal organism. If the results of therapy in increasing milk yield were open to question, however, there was the further advantage of increased productive life of the cow, which to his mind was a greater importance.

In reply to Mr. Hugh Begg, Dr. Edwards remarked that cows could be dried by ceasing to milk them immediately they had reached a yield of 5 to 7 lb. with advantage in prolonging the dry period and encouraging the rapid change in milk composition to the colostral state. Cows dry during the height of summer could be injected with penicillin at two-week intervals to prevent infection with *C. pyogenes*, but further work on the prevention of this infection was still necessary before a definite line could be advised.

Dr. Edwards said that he was interested to hear Mr. Wilson's views on the use of udder cloths. No doubt it was difficult to get milkers to use any technique which was complicated and involved much time. For these reasons he had recommended using an antiseptic milking technique only for 6 to 12 weeks in order to implement the effect of the treatment in destroying *Str. agalactiae* and to prevent reinfection in the early stages. He had suggested in his paper that the clinically acute form of staphylococcal mastitis did not respond to therapy with antibiotics, but that a good response had been obtained with the subacute and chronic forms. He was not satisfied that the sulphonamides were in any way superior to antibiotics administered in doses of 100,000 units repeated on four occasions.

(*Continued at foot of column 1, page 42*).

THE SENSITIVITY OF STRAINS OF *BACTERIUM COLI* ISOLATED FROM CASES OF CALF SCOURS TO CERTAIN CHEMOTHERAPEUTIC AGENTS

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The ultimate aim in the control of calf scours is its prevention by improvements in husbandry and sanitation. Until, or unless, this can be achieved, attention has to be paid to the treatment of clinical cases. In Great Britain the sulphonamides, particularly sulphamezathine, are frequently used for this purpose. Streptomycin and, occasionally, other chemotherapeutic agents are also employed.

It is a not uncommon observation that one form of treatment, successfully employed in cases of calf scours in one herd, may be valueless in another. Since this may be due to the fact that strains of *Bacterium coli* associated with calf scours differ in their degree of sensitivity, it was decided to determine the *in vitro* sensitivity to a number of chemotherapeutic agents of a series of strains of *Bact. coli* isolated from different cases of calf scours. The agents tested included sulphamezathine, streptomycin, chloramphenicol, aureomycin, terramycin and penicillin. The results of the investigation are reported in this paper.

MATERIALS AND METHODS

Origin of Bact. coli *Strains.*—Most of the 58 strains were obtained through the kindness of Dr. R. Lovell and Mr. P. C. Wood and had been recovered from cases of calf scours or from calf pens at the National Institute for Research in Dairying. The remainder were isolated from faecal specimens submitted by practising veterinary surgeons. These were taken from calves that were suffering from scours ; all these calves belonged to different herds.

Chemotherapeutic Agents.—The sensitivities of all 58 cultures were determined for sulphamezathine, sodium penicillin G, dihydrostreptomycin sulphate, chloramphenicol, aureomycin hydrochloride and terramycin hydrochloride. Strains found to be resistant to sulphamezathine were also tested against sulphathiazole and sulphamerazine. Freshly prepared solutions were always employed in the case of aureomycin. Solutions of sodium salts of the sulphonamides were used and their concentrations were expressed as mg. per 100 ml. The concentrations of the other agents, except penicillin, were expressed as microgrammes per ml. (μg. per ml.); penicillin was expressed as units per ml.

Determination of In-vitro *Sensitivities.*—A suitable range of twofold serial dilutions of the chemotherapeutic agents was made in 5 ml. of liquid medium. Each series of tubes and a control tube containing no agent was then inoculated with a suitably diluted *Bact. coli* culture. The tubes were incubated for 24 hours at 37° C. and read, the lowest concentration of the agent that completely inhibited bacterial multiplication as judged by visual examination being recorded as the minimal inhibitory concentration. The medium used for the sulphonamide tests was nutrient broth from which sulphonamide-inhibitors had been removed by means of lysed horse erythrocytes according to the method of Evans (1948). The bacterial inoculum was approximately 500 bacteria. For tests with the other agents ordinary nutrient broth at *p*H 7·2 and an inoculum of approximately 100,000 bacteria were used.

RESULTS

The sensitivity of the 58 strains of *Bact. coli* to sulphamezathine, dihydrostreptomycin, chloramphenicol, terramycin, aureomycin and penicillin is shown in Table I.

Sulphamezathine.—The growth of 44 (76 per cent.) of the 58 strains was completely inhibited by concentrations of sulphamezathine of between 1 and 8 mg. per 100 ml. Two strains required 16 mg. per 100 ml. for inhibition, two 32 mg. per 100 ml. and one 64 mg. per 100 ml. Nine strains (15·5 per cent.) were completely resistant. These nine strains were also completely resistant to sulphamerazine (Table II). Six of them were completely resistant to sulphathiazole and three were inhibited by 128 mg. per 100 ml. Table II also shows that two strains (10 and 11) exhibiting a considerable degree of resistance to sulphamezathine were much more sensitive to sulphamerazine and sulphathiazole.

Streptomycin.—The growth of 52 (89 per cent.) of the strains was completely inhibited by 0·5 to 8 μg. per ml. of dihydrostreptomycin. Four strains were inhibited by 16 μg. per ml. and one by 32 μg. per ml. ; one strain was completely resistant to streptomycin.

Chloramphenicol.—All except two of the 58 strains were completely inhibited by 1 to 8 μg. per ml. of chloramphenicol ; 16 μg. per ml. were necessary to inhibit these two strains.

Aureomycin.—Fifty strains were completely inhibited by 2 to 8 μg. per ml. of aureomycin, seven by 16 μg. per ml. and one by 32 μg. per ml.

Terramycin.—All 58 strains were completely inhibited by 1 to 8 μg. per ml. of terramycin.

Penicillin.—All 58 strains were very resistant to penicillin, 32 to 256 units per ml. being required to completely inhibit their growth.

DISCUSSION

There are many factors that determine whether or not a chemotherapeutic agent will be effective in the treatment of an infectious disease apart from the *in-vitro* sensitivity of the causal organism to the agent. These factors include the absorption, distribution, excretion, destruction and toxicity of the agent in the body and the ease with which drug-resistant mutants may arise. However, *in-vitro* sensitivity determinations have proved, in general, to be a useful guide to the value of a chemotherapeutic agent *in vivo*.

Since chemotherapeutic agents almost invariably prove to be valueless in the treatment of disease if they are without effect on its causal organism *in vitro*, it is highly probable that the treatment with sulphamezathine of calves suffering from scours associated with the nine strains of *Bact. coli* that were completely resistant to this agent *in vitro* would be of little use. The results (Table II) indicate that the use of other sulphonamides would also be valueless. With the exception of another three, the remainder of the strains were sensitive to sulphamezathine in concentrations that can be obtained in the blood of calves by oral administration (Francis, 1949; Schroeder *et al.*, 1949). On theoretical grounds, scours caused by these strains would merit treatment with sulphamezathine. It is of interest to record that some of these

One or two speakers had asked whether strains normally resistant to penicillin were found. So far as the speaker's experience was concerned, he had not found a single resistant *Str. agalactiae* culture amongst 63 freshly isolated strains and only two out of a similar number of *Staph. aureus* strains. Failure to eliminate infection could not, therefore, be attributed to this cause.

Replying to Professor Mitchell, the speaker said that he had not observed any irritation produced by applying 1·5 per cent. " Cetavlon " to milkers' hands even for a prolonged period; there might quite well be some idiosyncrasy in the way different persons reacted to its application and care should be taken that use was not made of concentrated solutions, which certainly produced the effect Professor Mitchell had observed.

TABLE I

THE SENSITIVITY OF 58 STRAINS OF *Bact. coli* ISOLATED FROM CASES OF CALF SCOURS TO CHEMOTHERAPEUTIC AGENTS

Chemotherapeutic agent	Unit of measurement of minimum inhibitory concentration	No. of strains for which minimum inhibitory concentration was									
		>256	256	128	64	32	16	8	4	2	1	0·5
Sulphamezathine ...	mg. per 100 ml.	9	0	0	1	2	2	4	15	20	5	0
Dihydrostreptomycin .	μg. per ml.	1	0	0	0	1	4	5	23	21	2	1
Chloramphenicol ...	μg. per ml.	0	0	0	0	0	2	17	18	16	5	0
Aureomycin	μg. per ml.	0	0	0	0	1	7	26	23	1	0	0
Terramycin	μg. per ml.	0	0	0	0	0	1	4	25	27	1	0
Penicillin	Units per ml.	0	1	12	34	11	0	0	0	0	0	0

μg. = microgramme. > = greater than.

TABLE II

THE SENSITIVITY OF SULPHAMEZATHINE-RESISTANT STRAINS OF *Bact. coli* TO SULPHAMERAZINE AND SULPHATHIAZOLE

Strain No.	Minimum inhibitory concentration (mg. per 100 ml.) of		
	Sulphamezathine	Sulphamerazine	Sulphathiazole
1	>256	>256	>256
2	>256	>256	>256
3	>256	>256	>256
4	>256	>256	>256
5	>256	>256	>256
6	>256	>256	>256
7	>256	>256	128
8	>256	>256	128
9	>256	>256	128
10	64	4	4
11	32	<2	<2

> = greater than. < = less than.

theoretical observations were supported by the reports of the veterinary surgeons who treated some of the calves from which these strains of *Bact. coli* were isolated.

With the probable exception of six strains, one of which was completely resistant, the strains of *Bact. coli* were sensitive to streptomycin in concentrations easily obtained in blood and tissue fluids. The proportion of resistant strains was much less than that found amongst strains of *Bact. coli* isolated from disease processes in human beings. Frank, Wilcox & Finland (1950), for example, found that 16·3 per cent. of 190 strains were resistant to concentrations greater than 1,000 μg. per ml.

Compared with other bacteria, most of the strains could be classified as being quite sensitive to chloramphenicol, moderately sensitive to terramycin and less so to aureomycin. The cost of these agents, however, is important when therapy is considered. The high degree of resistance of the *Bact. coli* strains to penicillin *in vitro* has been well borne out by clinical experience.

Since considerable variation was noted between the *in-vitro* sensitivities of the *Bact. coli* strains, particularly to sulphamezathine and streptomycin, the agents most commonly used in the treatment of calf scours, it would obviously be sound practice on farms where outbreaks of calf scours occur to determine the *in-vitro* sensitivity to chemotherapeutic agents of the prevalent strains of *Bact. coli*.

SUMMARY

A considerable variation was noted between 58 strains of *Bact. coli* isolated from different cases of calf scours when their *in-vitro* sensitivities to sulphamezathine and dihydrostreptomycin were determined. In general these strains were sensitive to chloramphenicol, moderately so to terramycin and less so to aureomycin; they were very resistant to penicillin.

These observations indicate the desirability of determining the *in-vitro* sensitivity of the prevalent strains of *Bact. coli* when the curative treatment of outbreaks of calf scours is contemplated.

Acknowledgments.—I am grateful to Mr. K. A. Piggins for his capable technical help. I also wish to thank Dr. R. Lovell and Messrs. P. C. Wood, I. Hall, A. F. Roddis and J. E. Beech for providing the strains of *Bact. coli* used in this work.

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"ABATTOIRS UNABLE TO COPE WITH WORK"

"PROBLEM OF ESCAPING CATTLE"

Under the above headings *The Meat Trades Journal*, in its issue of December 24th, reported that close watch was being kept by the R.S.P.C.A. on the movements of cattle in the centre of Birmingham as a result of two recent incidents when beasts ran loose and had to be rounded up with the help of other animals. The *Journal* proceeds to quote Mr. W. Eyton Davies, the Secretary of the Birmingham branch, as saying: "We are devoting all the time we can to observation of animals in transit from railway sidings to the lairages and into the abattoir. So long as it is permitted to drive these animals through the crowded streets, with the immense amount of traffic there is around the abattoir, we shall always have these distressing sights of escaping animals, distressing not only to the creatures themselves, coming straight from the quiet countryside and bewildered beyond all measure by the traffic, but to the onlookers also.

"In regard to abattoirs generally, they are all out of date to deal with the huge increase in the number of animals they are obliged to slaughter and handle in view of the fact that practically every private slaughterhouse belonging to butchers has been closed since the war. The consequence is that the abattoir authorities are hard put to it to know how to cope with the animals."

Mr. C. G. Allen, Chief Veterinary Officer to the Birmingham Corporation, is then quoted as agreeing that animals should not be driven through the central streets of a city like Birmingham. Apart from the distress they might suffer there was the risk of endangering traffic. So long, however, as the abattoir was in its present position such incidents as escaping animals were bound to occur. "We are hoping some day to build a new abattoir at Castle Bromwich, to which animals can be taken by rail or road. We keep asking for permission to start on the scheme, but so far have not had any success."

CLINICAL COMMUNICATION

AN ATYPICAL OUTBREAK OF SWINE FEVER IN A BREEDING HERD OF LARGE WHITES

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From recent outbreaks of swine fever seen in this area it would appear that the course of the disease has changed considerably from the classical pattern. One such outbreak is described.

Subjects.—At the beginning of the outbreak the herd consisted of 33 sows and gilts, 16 fat or nearly fat pigs and 42 pigs in six litters from a few days to four months old.

Description of Premises.—The pigs were housed in two sections about half a mile apart, but fed and managed by the same staff. One section was kept in arks, each ark being in a wired run of about 1,600 square yards. The other section was in various adapted buildings in a farmyard.

Herd History.—No pig had been bought in since November, 1952. Four pigs had returned from a show in June and another on July 2nd, 1953. On return, these were isolated in the yard section, and showed no suspicious symptoms of swine fever during the next 28 days. No recent outbreaks of swine fever had been notified in the immediate neighbourhood of this farm. Feeding was meal plus "Tottenham" pudding, cooked at source.

History of Outbreak.—On July 31st two seven-month-old gilts, in the ark section, were seen. Temperatures were 106° and 105°. Both pigs were listless and off food and one was disinclined to get up. Early erysipelas was suspected and 1,000,000 units of crystalline penicillin were given to each. On August 1st, there being no improvement, 2 oz. of sulphamezathine were given and penicillin continued. On August 2nd there was still no change but it was now evident that the pigs had passed no faeces for three days. It was also noticed that the pasture contained a large percentage of ragwort which had been cut and left lying in bundles. Ragwort poisoning was considered to be a possibility, despite lack of literature on this subject. Two further doses of penicillin and sulphamezathine were administered and the pigs were given soap and water enemata, carbachol, istin and calomel over the next few days. By August 5th the pigs were passing faeces regularly and eating a little; temperatures were 102·5° and 103°. From now on, they made a slow but steady recovery; one showed small peeling areas in the skin a few weeks later.

On August 26th four 12-month-old in-pig gilts were seen. These had been in the ark section next to the two gilts previously treated, but had now been moved to the yard section. All were off food and temperatures ranged from 103° to 104·5°, and one showed purplish discoloration of the abdomen. The most marked feature was constipation. The pigs passed hard, mucus-coated faeces which crumbled under foot to a dry sand-like consistency. Sulphamezathine was given by injection and calomel and istin by mouth.

The possibility of swine fever was considered and the farmer advised to institute appropriate precautions. However, it seemed more possible that this was an outbreak of "sleepy pig disease," a disease that has been reported from various parts of the country and which exhibits a similar syndrome. The cause of this is unknown and the treatment empirical. It was decided that should any pig die, it should immediately be taken to the Veterinary Investigation Laboratory.

Next day these pigs were brighter and temperatures about a degree lower. Further sulphamezathine was given. The same day a sow due to farrow in two weeks was seen with a temperature of 102·5° and eating less than usual. Two million units of penicillin were given.

On August 28th the farmer reported an improvement in all pigs and the farm was not visited.

On September 4th the same sow was seen again, with a temperature of about 103° and showed signs of farrowing. Crystalline penicillin, 1,500,000 units, and 2½ oz. of sulphamezathine were given. The next day the sow gave birth to 17 dead pigs, one week before her time. She was given penicillin and sulphamezathine for two days and made an uneventful recovery.

On September 7th a boar and gilt were seen in the yard section. Both were off their food with raised temperatures and markedly constipated with earth-like crumbling faeces. After two injections of sulphamezathine they returned to their food and although temperatures were still elevated they appeared normal in other respects.

On September 10th two seven- to eight-month-old gilts were seen in the ark section. These were off food, and on being chased round their enclosure showed an occasional stagger. Sulphamezathine was given and next day the farmer reported such an improvement as to make a visit unnecessary.

There was apparently a gradual improvement in all the affected pigs which, although they were intermittently off food, lost little or no condition. On September 15th a seven-week suckling pig, running in the ark section, died. The owner took this to the Veterinary Investigation Laboratory, where swine fever was suspected and later confirmed by the Ministry. The lesions, in fact, were so classical that the laboratory suggested keeping the viscera as a demonstration specimen! The laboratory report stated that there were haemorrhages in the medulla of the kidney, the kidney pelvis being filled with blood; numerous petechiae were present throughout the whole length of the intestinal tract; there was evidence of haemorrhagic gastritis, and an equally marked haemorrhagic cystitis, and haemorrhages were present in the larynx.

On September 16th the farm was visited. In the litter from which the dead pig came one pig was scouring (temperature 104·5°). The remainder showed no symptoms, but generally lacked bloom. The sow appeared normal.

A check was made of all the remaining pigs on the farm. One gilt seen on September 10th was very staggery and weak on its hind legs, was covered with purple blotches and had a temperature of 105·5°. Until the day before she had apparently been making good progress. Apart from this there were no obvious clinical symptoms in any other pigs, except that some of those treated previously were still not clearing up their food. Also some had temperatures a degree or two above the normal. Except for the one litter there were no symptoms in any pig under seven months, although there were five litters and several stores on the farm.

Next day, September 17th, one further piglet from the affected litter died and a *post-mortem* examination showed typical deep petechial haemorrhages in the kidney. The seven-month gilt referred to above also died. In the latter case the kidneys were unaffected but petechial haemorrhages were found in heart, lung and bladder. There were no ulcers.

On September 18th all fat pigs were slaughtered and swine fever serum was given to all the pigs remaining on the farm.

On September 23rd two more of the pigs from the sick litter had died and one gilt, which had not shown previous symptoms but had been to a show in July, was staggering and had a temperature of 104°. The sow with the litter was given a further 100 c.c. of serum and her pigs a further 25 c.c. each. The gilt was given a further 65 c.c. serum.

The farm was not again visited, but the owner informed us that two more of the affected litter died and two more

were killed when seen to be unwell. In the next 20 days no other pigs developed symptoms and all those affected had improved. On the 28th day after confirmation by the Ministry a 14-day-old piglet died and swine fever was reconfirmed.

Discussion

For a period of six and a half weeks, although 11 pigs were treated, none showed symptoms typical of swine fever. At the end of this time one young pig died with lesions typical of swine fever, and one adult pig died showing a more or less typical *post-mortem* picture except for absence of intestinal ulcers. It has been suggested that there were, in fact, two separate diseases on the farm, and the earlier symptoms were not due to swine fever, which was not introduced until shortly before September 15th. This, however, seems extremely unlikely in view of the abrupt arrest of the spread of disease in adult pigs which followed the administration of swine fever serum.

Assuming, therefore, that the whole outbreak was one of swine fever, the following points are considered atypical :—

(1) The spread of infection was extremely slow.

(2) Despite the presence of several litters of young pigs and stores, for six and a half weeks, the disease was confined to adult stock.

(3) In affected adult pigs, constipation was always a prominent symptom.

(4) Many affected pigs treated only with one or two injections of sulphamezathine made a slow but steady recovery.

A possible factor in altering the course of the outbreak may have been the early administration of sulpha drugs and antibiotics. These may have eliminated secondary infections and left an uncomplicated virus disease.

ABSTRACTS

Caesarean Section in the Bovine*

In this second contribution the author records data on 45 additional cases attended by him and his clinical staff. These comprised 26 first calf heifers and 19 cows and the breeds chiefly concerned were Friesian, Ayrshire and Shorthorn, which reflected the breed population of the district. Thirty-nine cases were received from practising veterinary surgeons, and in only three cases was the operation premeditated. In the rest dystocia varying in degree from five hours to several days was the moving factor. The over-all maternal recovery rate was 62 per cent. The chances of recovery bore a direct relationship to the length of time the patient had been in the second stage of labour. It was generally accepted that a live calf at the time of operation indicated a recent case which circumstances elevated the recovery rate to 76·5 per cent. Of 14 live normal calves delivered by operation, 12 survived. Three cases of *Schistosomus reflexus* were dealt with—all alive when delivered—and in each case the mother survived. The calf was dead in 25 cases at the time of operation. The maternal recovery rate in this group was 52 per cent. despite the fact that in some there was putrefaction of calf and foetal membranes. The indications for operation were : foetal oversize 14 (33 per cent.) ; developmental abnormalities 14 (33 per cent.) ; incomplete dilatation of the cervix 10 (22 per cent.) ; uterine torsion 7 (15 per cent.) ; retained foetal mummy 2 cases.

It was found that in all cases where the calf was alive at operation the foetal membranes were firmly attached. No attempt was made to detach them and in the majority of cases the membranes were expelled within seven hours post-operatively.

In 24 cases where the second stage of labour was protracted and the calf dead, the membranes were easily removed at operation in 16 of them. In eight the placenta was adherent and retained for periods varying from two and a half hours to 17 days. In four cases which terminated fatally the placenta was retained until death.

In analysing the cause of death in the 17 animals which died the author cites early generalised peritonitis as the responsible factor in five of them—all delayed parturition cases—and *post-mortem* examination revealed a flaccid sub-involuted uterus with necrosis at the site of incision.

Shock, toxaemia and haemorrhage, collectively or singly, were responsible for six deaths. In one case bulbar paralysis occurred when chloral narcosis was followed by chloroform inhalation. A post-operative ventral hernia developed in two animals and they were destroyed. A case of *Schistosomus reflexus* was found to be inoperable and the mother destroyed.

The author describes his operative technique and the manipulation of the foetus in detail. Anaesthesia in the main consisted of intravenous chloral hydrate augmented by local infiltration along the line of incision and/or chloroform inhalation. In two, nembutal intravenously supplemented the chloral anaesthesia and in these cases was eminently satisfactory. The operation site was 4 to 6 inches lateral to the right mammary vein, and the length of abdominal incision varied from 10 to 14 inches. The wound was repaired in two layers. The first, peritoneum, rectus and abdominal tunic, by interrupted sutures of No. 4 21-day chromic catgut used double ; the second, panniculus and skin, by interrupted sutures of No. 4 fine silk. Penicillin ointment was applied to the deeper layer.

Post-operatively, patients were placed in one of three groups, *recovery uneventful*, *recovery stormy* and *death*. Seventy per cent. of the total recoveries comprising 14 first-calf heifers and six cows had an uneventful recovery. Appetite returned to normal within five to six days and milk yield progressively increased. Healing of the wound was generally good. A post-operative rise in temperature—not constant—was regarded as a healthy sign of recovery. The pulse rate was regarded as a more reliable guide to progress than temperature, even though there was some irregularity. In the majority the rates during the first few days ranged between 90 and 110, subsequently falling to within 70 to 90. A pulse rate of 90 to 100 at the end of the fourth day was viewed with some concern and generally indicated a developing peritonitis.

In the group in which recovery was " stormy " (four cows, three heifers) the calf was dead in four cases and in three of these the second stage of labour was long delayed. Contributory factors to delayed recovery in this group were excessive manipulation and peritoneal trauma (*Schistosomus reflexus*), subinvolution of uterus, retention of foetal membranes and delayed interference. In one subject where the calf was alive and in which the operation was straightforward protracted recovery was inexplicable. Post-operative inappetence and a high pulse rate were features in this group.

In the third category seven cases of maternal death are reviewed, six of which died 40 hours to eight days following operation. The seventh died more than a month later due to peritonitis from an abscess at the site of incision. The common cause of death was generalised peritonitis. In five the calf was dead and in five the membranes were retained until death. In four cases gross intra-abdominal interference was a possible factor. Inappetence persisted throughout. Temperatures ranged between 99·5° and 102·5°. The pulse rate remained in the region of 100. The indications of

* **Further Observations on Caesarean Section in the Bovine.** Wright, J. G. (1953). *J. comp. Path.* **63**, 211.

peritonitis were characterised by rapid and shallow respirations with a grunt on expiration, an acute abdomen and recumbency. Free use of penicillin was of no avail.

Subsequent breeding histories are available for only 11 animals. Six, from the "recovery uneventful" group, have had one or more calves. Five have failed to conceive to frequent service. These were among those in which recovery was "stormy" and where it was possible to examine these patients *per rectum* widespread adhesions involving uterus and ovaries were detected.

It is difficult in the space available to do justice, in abstract form, to this most comprehensive treatise on the subject, and it should be perused in the original by those especially interested.

C. F.

* * * * *

Magnesium Supplements and Hypomagnesaemia in Cattle*

It was shown in 1938 and 1947 by Green & Allcroft, and again by Blakemore & Stewart in 1935, that the feeding of additional magnesium limited to some extent the fall in serum-magnesium which occurred in bovines at certain times of the year. Although such feeding did not necessarily maintain the normal level, evidence suggested that it reduced the incidence of hypomagnesaemia. In the present communication more recent work is reported. On two farms where the disease was occurring, 2 oz. magnesium oxide per head were fed daily to selected cows. The serum magnesium values were raised from sub-normal to normal at a time when clinical cases of hypomagnesaemia were occurring in untreated controls. On introduction of the supplement a rapid rise was noted and on both farms a sharp drop in blood magnesium was observed two days after this was stopped.

Pasture analyses made on Farm B over a period of eight months, commencing at the beginning of April, indicated a fall in MgO from 0·22 to 0·16 per cent. during the first fortnight of that month. The level returned to the former figure by the end of the month and varied but slightly above and below this level during the subsequent seven-month period. The fluctuations in pasture levels did not coincide with fluctuations in blood levels which were almost at a maximum when severe cases occurred during the first few months of the year.

Towards the end of May on Farm A and a little later on Farm B the serum magnesium levels of the control groups rose to normal levels and were similar to those of the cows receiving the supplement. Where the pasture contained 0·16 per cent. of MgO it was estimated that an intake of 30 lb. of dry matter per day would provide 15 g. of magnesium which is considered to be adequate.

That feeding magnesium-rich supplement does not always have a beneficial effect is indicated by recent evidence in which 2 oz. of calcined magnesite containing 2 per cent. of MgO fed during the susceptible period of May and June did not maintain normal Mg blood levels in cows gradually turned out on to rapidly growing pasture. The fact that the latter had been heavily top-dressed with a nitrogenous fertiliser may or may not be of some significance, but the difference in results between Farms A and B as compared with C explains prevailing, conflicting reports.

N. S. B.

* **The Effects of Oral Supplements of Magnesium Oxide on Hypomagnesaemia in Cattle.** Allcroft, R. (1953). *Proc. Pt. I Int. Vet. Congr., Stockholm.* **1.** 573–578.

Coccidiosis in Sheep*

Oocysts are frequently observed in the faeces of healthy sheep, and for this reason coccidiosis in sheep is not regarded as a disease. However, a series of reports by Salisbury & Whitton,[1,2,3] suggests that under certain conditions coccidia can cause symptoms and death in sheep. This evidence on the potential pathogenicity of coccidia in sheep came from both naturally occurring outbreaks and experimental work.

Seven species of coccidia of the genus Eimeria occur in sheep of which *E. arloingi* is considered to be the most pathogenic. The disease ascribed to coccidia is usually observed in four- to six-month-old lambs which are grazing on very lush, damp, pasture. The affected animals show signs of abdominal pain, diarrhoea, with loss in weight, and anaemia. The faeces are brownish to yellow green in colour, and may be streaked with blood. A *post-mortem* examination reveals an enteritis and typhlitis with white spots on the serosal surface of intestines and caecum.

Three daily doses of 0·1 gramme per kg. bodyweight of sulphamezathine was considered to be the most effective therapeutic treatment. As the coccidiosis is associated with a superabundance of lush pasture, the removal of the flock to inferior pasture, or brassicas, is also recommended.

D. W. J.

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[2] Whitten, L. K. (1953). *Ibid.* **1** (4).
[3] Salisbury, R. M., & Whitten, L. K. (1953). *Ibid.* **1** (4).

* **Coccidiosis in Sheep: Coccidiosis as a Probable Cause of Unthriftiness and Death in Lambs. A Preliminary Field Experiment on the Treatment of Coccidiosis in Lambs.** Salisbury, R. N., Whitten, I. K., *et al. N.Z. Vet. J.* **1.** 69–80.

REVIEW

[Royal College of Veterinary Surgeons' Library: Catalogue of the Historical Collection (Books published before 1850). Printed by Jarrold & Sons, Ltd., Norwich; published by the Royal College (1953) from 9–10, Red Lion Square, London, W.C.1. Price 2s. 6d.]

The service rendered by the R.C.V.S. Library in making available to Members the modern output of worthwhile veterinary books and periodicals is a source of great satisfaction to the ever-increasing number who take advantage of it. Less well known, perhaps, is the steady build-up from Dr. Bullock's day, under the guidance of the Library Committee, by the present Librarian, of a collection of major works in veterinary and allied fields of which the profession may well be proud. Many of these now form what is known as the Historical Collection and are of interest and value not merely because of their antiquity but as records of pioneering advancement in the practice and theory of our art and science. We welcome, therefore, the issue of this catalogue of the Historical Collection as a very well worth while consummation of much industry and research on the part of the Librarian and her assistant, achieved in addition to their regular duties. Moreover, this 86-page brochure is a model of sensibly arranged text and type and, therefore, of clarity. As is stated in the preface, which records the genesis both of the Historical Collection and of its catalogue, notification of error and suggestions for additions to the Collection are welcomed by the Librarian.

The catalogue admirably fulfils its aim of providing a useful addition to the available sources of reference and we can only

hope that, at the modest price of half a crown, it will achieve the circulation merited by such a well-ordered medium of reference to early veterinary and collateral literature. Some of our own former authors, indeed, are shown by this agency to have been astonishingly prolific by modern standards, *e.g.*, no fewer than 54 entries stand to the credit of Bracy-Clark. The purchaser can be assured of finding this catalogue a source of helpful reference to the generality of our early literature—about which we all admit we should know much more than in fact we do—and, also, almost certainly a guide to some volume or treatise which will throw fresh light on his or her special veterinary interest.

REPORT

[Report of the Second Inter-American Meeting on Livestock Production. Edited by Ralph W. Phillips. FAO Development Paper No. 33, June, 1953, pp. vii and 138. (Obtainable from H.M.S.O., price 7s. 6d.)]

This report provides a brief account of the conference convened jointly by the FAO and by the Inter-American Institute of Agricultural Sciences, and held from December 8th to 15th, 1952, at Bauru, Brazil. There was a large attendance of delegates from 19 countries, while the FAO headquarters staff in attendance included Sir Thomas Dalling. During the conference over 100 papers were presented, most of them to the three main sections, *viz.*, (I) Animal Breeding ; (II) Animal Nutrition, Feeding and Management, and (III) Veterinary Problems.

Resources apparently did not permit of an extensive record of the proceedings, and it is to be hoped that the many interesting papers, the titles of which are listed, will appear elsewhere. As a source of information the report itself is frankly disappointing. The only contribution published in detail is the introductory paper by Dr. R. W. Phillips entitled " Some basic problems in livestock production and management," much of the factual material in which has already appeared in the valuable review contributed by the author to *Nutrition Abstracts and Reviews*. (1950–51). **21.** 214–256. The remaining papers are not dealt with in the form of succinct précis or summaries but are referred to in general chapters that rarely provide any authorship for the various statements quoted.

As in any such conference, the papers were obviously of a very mixed standard and the scope of some is not even mentioned in the general chapters. In other cases the reasons for unusual statements are left unexplained. Thus it is stated that " The delegation from Paraguay reported a hypocalcaemia that had been found in that country. The average value for blood calcium in 862 samples analysed was 11·62 mg. per 100 gr. This value was far below the 15 mg. per cent. which is considered as a normal value." If this statement refers to serum calcium levels in bovine blood then there would appear to be a profound difference as compared with the values obtained in Great Britain, the U.S.A., Australia and elsewhere, in which 11·62 mg. per 100 ml. would suggest a marked hypercalcaemia or, more probably, an error in technique.

The report includes a summary of the somewhat generalised recommendations that were passed, in the main urging the governments of the various Americas to initiate projects or to co-operate in disease control.

A. N. W.

NOTES AND NEWS

Diary of Events

Jan. 16th.—Meeting of the Biochemical Society, in the Department of Chemical Pathology, Post-graduate Medical School of London, Ducane Road, W.12, 11 a.m.

Jan. 21st.—Special Joint Meeting of the Central Veterinary Society, the Herts and Beds Division and the Royal Counties Division, B.V.A., at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

Jan. 27th.—Meeting of the West of Scotland Division, B.V.A., in the Glasgow University Veterinary School, 2.30 p.m.

Jan. 27th.—Meeting of the Supplementary Veterinary Division, B.V.A., at the Wellcome Research Laboratories, Langley Court, Beckenham, Kent, 2 p.m.

Jan. 27th.—Second Pharmaceutical Society Meeting to introduce The British Veterinary Codex (*see Notice*).

Jan. 28th.—Meeting of the North of Scotland Division, B.V.A., in the Northern Hotel, Aberdeen, 2.30 p.m.

Jan. 29th.—Meeting of the Mid-West Veterinary Association, B.V.A., in the Berkley Café, Clifton, 2.15 p.m.

Jan. 29th.—Meeting of the Lincolnshire and District Division, B.V.A., at the Saracen's Head Hotel, Lincoln, 2.15 p.m.

Jan. 29th.—Special Meeting of the East Midlands Division, B.V.A., at the Saracen's Head Hotel, Lincoln, 1.30 p.m.

Feb. 11th.—Royal (Dick) School of Veterinary Studies Annual Ball, in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m. Proceeds to the Victoria Veterinary Benevolent Fund.

Feb. 26th.—University of Liverpool Veterinary Society Annual Ball, in the Students' Union, Bedford Street, Liverpool.

Mar. 25th.—V.V.B.F. Ladies' Guild: North of Scotland Division, B.V.A., Annual Dance, Aberdeen (*see Notice*).

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Change of Date of Next Meetings of Council and Committees, B.V.A.

Owing to the fact that headquarters has moved to 7, Mansfield Street just before Christmas, the meetings fixed for early January have been postponed until Wednesday, Thursday and Friday, January 20th, 21st and 22nd, 1954.

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January Meetings of Council and Committees, B.V.A.

Wednesday, January 20th, 1954:—

10.0 a.m. Veterinary State Medicine Committee.
12.0 noon. Home Appointments Committee.
1.0 p.m. Interval for Lunch.
2.0 p.m. Organising Committee.
3.30 p.m. Parliamentary and Public Relations Committee.
At 7, Mansfield Street, Portland Place, London, W.1.

Thursday, January 21st, 1954:—

10.0 a.m. General Purposes and Finance Committee.
1.0 p.m. Interval for Lunch.
4.30 p.m. Official Opening of New B.V.A. Headquarters.
At 7, Mansfield Street, Portland Place, London, W.1.

Friday, January 22nd, 1954:—

11.0 a.m. Council Meeting.
At the Connaught Rooms, Great Queen Street, W.C.2.

Official Opening of New Headquarters

As briefly announced in the Diary of Events, the Duke of Norfolk has kindly accepted an invitation to be the guest of honour when the new headquarters are officially opened on January 21st. The Duke will make a short address to the guests, which will be replied to by the President. A distinguished company, representing all branches of the profession and all Divisions, has been invited, and it is hoped that the occasion will be a really effective send-off to the new premises, which have become the Association's own for the better part of 1,000 years. Guests are invited for 4.30 p.m., when tea will be served. After the speeches the house will be thrown open so that everyone may enjoy its delightful amenities, which include, as already described in an earlier issue of the *Record*, some very beautiful Adam ceilings and mantelpieces, with magnificent chandeliers in the principal committee rooms. A full account of this opening ceremony will appear in the *Record* of January 30th.

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PERSONAL

Births.—Frost.—On January 9th, 1954, to Marguerite, wife of Hugh Frost, M.R.C.V.S., a daughter.

Hartley.—On December 17th, 1953, to Anne, wife of R. Wentworth Hartley, M.R.C.V.S., of Tankerdale Farm, near Petersfield, Hants—a son.

Schwarz.—On December 23rd, 1953, to Jessie, wife of Robert A. J. Schwarz, M.R.C.V.S., 41, North Road, Bourne, Lincs, a son—John Barrington.

Taylor.—On December 19th, 1953, to Phyllis Margaret, wife of L. A. Taylor, B.V.Sc., M.R.C.V.S., of Pinxton, Notts, twins: a son, David Coxon, and a daughter, Elizabeth Jane—a brother and sister for Anne Margaret.

Turton.—On December 26th, 1953, at Edinburgh, to Elizabeth, wife of John D. Turton, B.Sc., M.R.C.V.S. (Department of Animal Health, Gold Coast), a son.

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Forthcoming Marriage.—McKay—Goddard.—The engagement is announced between Thomas M. McKay, M.R.C.V.S., Veterinary Officer, Ministry of Agriculture and Fisheries, Carmarthen, and Miss J. A. Louise Goddard, "Caeberys," Johnstown, Carmarthen.

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Marriage.—Bishop—Osborne.—On December 28th, 1953, at St. George's Church, Tanglin, Singapore, Captain Harry Wilkinson Bishop, R.A.V.C., younger son of Mr. and Mrs. H. H. Bishop, of Malvern, Worcestershire, and Miss Patricia Elizabeth Osborne, younger daughter of Mr. and Mrs. A. V. Osborne, of Lyndhurst, Hampshire.

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Retirement of Mr. William Harley.—Mr. William Harley, M.R.C.V.S., of Bourtreehill, Hamilton, is retiring after 35 years' practice in the town. Mr. Harley is an ex-President of the West of Scotland Division of the Association and of Hamilton Rotary Club.

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Members of the profession may be interested to know that in the wills published on Saturday, January 9th, 1954, Major Harry Edward Keylock, F.R.C.V.S., racehorse owner and breeder, of Newmarket, left £30,175.

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International Rugby

Mr. A. K. Fulton (Dollar Academicals), who played in the Scottish team against France at Murrayfield on Saturday last, is the son of Mr. Adam Fulton, M.R.C.V.S. Mr. Fulton was playing scrum half.

Mr. William Brown, M.R.C.V.S.

The death of the Editor of *The Veterinary Record* took place so suddenly, and so unexpectedly, that there was time only to print a brief memoir in our last issue. His many friends will be interested to have the following further details of his career.

William Brown was born and spent his early years at Wivelscombe in Somerset. His father was a veterinary surgeon and he grew up in the atmosphere of a busy country practice. From 1901-1908 he studied at Sidcot School, Somerset, where he became interested in journalism, and on leaving school he went to Taunton to train as a professional journalist on the staff of one of the provincial papers. Subsequently, however, he decided to follow his father's profession and entered the Royal Veterinary College in 1918, qualifying for his M.R.C.V.S. in December, 1922.

In 1915 he married Dorothy Rolfe, and after becoming a veterinary surgeon he and his wife moved to Welwyn Garden City, where they remained until 1948. During this time he was elected a County Councillor and took a considerable interest in local government.

In 1948 he moved to Billericay in Essex, but in August, 1953, his "house by the sea," to which he had much looked forward, was completed, and he and his wife moved to Saltdean in Sussex, where he planned to spend his retirement.

Mr. Brown was a member of the Society of Friends all his life, and those who lunch at Friends House will miss his friendly personality, as he often joined them there.

The funeral service took place at the Golders Green Crematorium and was conducted in the quiet and simple manner of the Society of Friends. Among those who spoke was a cousin, who referred very movingly of the man to whom all those present were paying a last tribute. He was always kind, always friendly and human, with a real depth of sympathy and understanding. Such gifts were not, perhaps, spectacular, but they were living ones. There were many present, she was sure, who would perhaps be the kinder, the wiser and the more understanding because they had known William Brown. The challenge of his life would come back—in trying to make a quick decision or in making a hasty judgment one might remember his calm manner and try to pass on his gift of human understanding. He gave of that most generously and it was a heritage for those who wished to serve their fellow-men.

Among those present at the funeral were Mrs. D. Brown (widow), Mr. and Mrs. William Brown (son and daughter-in-law), Miss E. Rolfe (sister-in-law), Miss E. A. Rolfe (sister-in-law).

From B.V.A. Headquarters.—Mr. A. Thomson (President), Mr. A. M. Graham (Senior Vice-President), Mr. H. E. Bywater (Hon. Treasurer), Mr. J. M. Ingram (Hon. Secretary), Mr. F. Knight (General Secretary), Miss Mary Brandenberg (staff), Miss Valerie Till (staff), Miss Rosa Smith (staff).

Representing the Editorial Committee.—Mr. D. L. Hughes (Chairman), also representing Boots Pure Drug Co.; Mr. H. E. Harbour, and also representing the Cooper Technical Bureau; Miss J. O. Joshua, and also representing the Society of Women Veterinary Surgeons; Mr. W. A. Pool.

Representing the Royal College of Veterinary Surgeons.—Professor R. E. Glover (President), and also representing the Lancashire Division; Dr. W. R. Wooldridge (Junior Vice-President); Mr. G. N. Gould; Mr. W. G. R. Oates (Registrar).

Dr. R. F. Montgomerie (Past-President), and also representing the Wellcome Foundation; Major R. C. G. Hancock (Past-President), and also representing the R.S.P.C.A.; Dr. S. J. Edwards (representing Dr. W. S. Gordon and staff of the A.R.C. Field Station, Compton); Mr. Neil Mathieson.

Divisions of the B.V.A.—Miss W. M. Brancker (representing the Midland Counties Division), Professor J. McCunn (representing the Central Division and the *Veterinary Journal*), Dr. W. M. Henderson (representing the Central Division), Professor H. G. Lamont (representing the North of Ireland Division), Major Hamilton Kirk (representing the Society of Practising Veterinary Surgeons), Major J. M. Smith (representing the Royal Counties Division), Mr. T. Watkins (representing the Supplementary Veterinary Register Division), Mr. E. Cotchin (representing Professor T. J. Bosworth, Professor R. Lovell and the Department of Pathology, Royal Veterinary College, and the Association of Veterinary Teachers and Research Workers).

Mr. G. Moore (representing Messrs. H. R. Grubb, Ltd., printers).

Mr. J. A. Leslie (representing Messrs. Burroughs, Wellcome & Co.), Mr. H. W. Eley (representing Messrs. Baillière, Tindall & Cox, and the *Veterinary Journal*), Mr. J. M. Kirkness (representing the Association of British Pharmaceutical Industry).

Mr. R. S. Catford (representing the Society of Friends).

Flowers were sent by: the family, the President of the B.V.A., F. Knight (General Secretary), Rosa Smith, and other staff of the B.V.A., Mr. Fredericks, Mary Brandenberg and Valerie Till, The Editorial Committee, The Royal College of Veterinary Surgeons, Mr. and Mrs. G. N. Gould, Mr. W. Nairn, Mr. Neil Mathieson, The Royal Counties Division, B.V.A., The North of Scotland Division, and other Divisions of the B.V.A.

Tributes and letters of sympathy have also been received from the following: Glaxo Laboratories, Ltd.; Mr. G. F. Smith, M.R.C.V.S., of The Milk Marketing Board; The Royal Counties Veterinary Medical Association; Messrs. Baillière, Tindall & Cox, Ltd.; The Lancashire Veterinary Association; Dr. N. S. Barron, M.R.C.V.S.; Mr. H. E. Harbour, M.R.C.V.S.; Mr. S. F. J. Hodgman, M.R.C.V.S.; Mr. G. Atkinson, M.R.C.V.S.; Mr. Harry Cooper, and Messrs. H. R. Grubb, Ltd.

Personal Tributes

From Professor R. E. Glover, President of the Royal College of Veterinary Surgeons.

I am indeed very distressed to hear of the sudden death of Brown, news of which reached me to-day. I know his health had been giving him some anxiety, but one had hoped that he would have continued with his work on the *Record* in which he took so much pride and that he might have been spared to enjoy a well-earned retirement.

He was a fellow student with me at the R.V.C., London, and I have followed his career with interest. I know that in common with innumerable members of the profession, his ever constant courtesy and kindness and his devotion to the Association have been the factors in his life which have impressed me most. I know, too, that I, like many other former Chairmen of the Editorial Committee, have reason to be ever grateful to him for his unassuming help and wealth of knowledge of all matters pertaining to the production of the *Record*. He was justly proud of a continuous production of the journal in spite of war-time difficulties, strikes and shortage of staff, and throughout his association with the B.V.A. he was determined to give of his best.

The Association has truly suffered a grievous loss. On my own behalf and also as spokesman of the Council R.C.V.S. may I convey to the B.V.A. our sympathy and regrets at the passing of a loyal servant and a distinguished journalistic member of the profession.

From Miss J. O. Joshua.

The appalling suddenness with which we face the gap left by the death of William Brown brings home to many of us how far, by his self-effacing nature and devotion to duty, Brown the man was submerged in Brown of *The Veterinary Record*.

He has played a full part in setting that high standard of loyalty and of service which those of us who see something of headquarter's staff realise the Association is so fortunate to enjoy. We shall be fortunate indeed if we secure again such high ideals of sincerity and duty.

Nothing shows more clearly Brown's own stability of character than the way in which, although working with an annually changing Editorial Committee and its succeeding Chairmen, he was able to maintain professional uniformity and personal equanimity.

The last 15 years have not been easy for anyone responsible for the production of a weekly scientific journal. During the war years Brown chose to remain at Gordon Square to facilitate the regular appearance of our *Record* by being near the printers. His unfailing regularity in attendance meant that he had to suffer, to put it at its lowest, all the inconveniences of war-time London. Stringent paper rationing, which bore especially hardly on scientific periodicals, meant that Brown had, with never failing courtesy and sympathy, to equate the shrinking columns of the *Record* with the importunities of increasing numbers of authors who, with the phenomenal increase in stature of our Association and thus its official journal, sought the hospitality of its columns. Next, the rocketing price of newsprint was a constant source of worry to the editor of a journal whose advertising revenue could never be unlimited. When at last paper restrictions began to ease and the ceiling price of newsprint seemed in sight he was faced by difficulties within the printing trade. Even so, the profession received a weekly cyclostyled news-sheet as a token of Brown's bid to fill the gap. Outwardly he showed little evidence of this long period of stress but one is now left wondering if, in fact, it had taken its toll.

Whilst sympathising most profoundly with his family in the shock they suffered by his sudden death I personally feel that for Brown himself this was a happy end. I may be wrong, but I believe retirement, which was not far distant, would not have been to him an unmixed blessing, so closely was he integrated with his work. To go as he did, quickly, cleanly, at the end of a good day's work, a good week's work with the *Record* off the press, and more, a good year's work which had seen many encouraging, if small, improvements in our journal and the Association now settled in its new headquarters, is an end many of us may well envy.

Brown certainly deserves the epitaph—" Well done thou good and faithful servant."

From Mr. H. E. Bywater (Hon. Treasurer of the B.V.A.)

It was my privilege to have known Mr. William Brown for over 30 years. My first contact with him was at the Royal Veterinary College, whilst we were students, but I became more intimately associated with him, from the early 1930's until his passing, as a result of my activities with *The Veterinary Record* and the Association.

His modest, unassuming and conscientious nature reflected his religious convictions which coloured his whole behaviour and which must, surely, leave its impression on those with whom he was closely in contact.

He was truly a " gentle " man, whose like are all too few in these times of materialistic cynicism.

William Brown will be missed but his memory will remain.

We respectfully tender our condolences to his family.

From Major Hamilton Kirk.

The news of Mr. Brown's sudden death came to me as a great shock. During the past 35 years or more I have co-operated with Brown in his work and always found him a thorough gentleman: courteous, obliging and unassuming. It seems unbelievable that he has now passed away. I have lost a good and valued friend; and my profession has lost a loyal and efficient servant—hard to replace.

From Dr. W. M. Scott.

I was very grieved indeed to read in *The Times* of the 4th instant of the tragic passing of my old friend Mr. William Brown.

I have known him for well-nigh three decades—and his father before him—and I have always found him courteous, helpful and painstaking to a degree.

His heart and soul were in his work and his profession and *The Veterinary Record* will ever remain as a monument of his skill and industry as an editor—a worthy successor to that G.O.M. William Hunting, the founder of the " V.R."

To be the editor of any paper is no easy task but to run a paper such as the *Record*, catering for so many interests, requires a superabundance of tact and judgment, and Brown possessed these to a marked degree.

By his sudden and premature passing he has stolen a march on his contemporaries and gained his crown, leaving behind a trail of service, well done.

William Brown has won his spurs, a valiant knight, but the pages of the *Record* in particular, and the profession in general, are the poorer by his passing.

" *Requiescat in pace.*"

From Professor George F. Boddie.

Though one had known for some years that his health had not been too good and though a letter written to him early in December was acknowledged by his secretary, who referred to an indisposition that was likely to be lengthy, the notice in the

Sunday Times of January 3rd of Mr. Brown's sudden death came as a profound shock.

I have had the privilege of knowing Mr. Brown for the best part of 30 years. During those 30 years the older members of the profession have seen the N.V.M.A. grow from small beginnings to its present-day strength under its new name of the B.V.A. While no one would wish to detract from the valuable services given to the Association by successive generations of office-bearers, the wonderful progress of our Association would have been quite impossible without the continuous self-effacing loyalty of the small group of permanent officials who keep the office running efficiently. From intimate personal knowledge I can state with the utmost confidence that no association could have been more fortunate than ours in this respect and the contribution made by Mr. William Brown will long be remembered by those who have had the opportunity of assessing its true value.

The editing of the journal of an association such as the B.V.A. can never be an easy task, for the journal must cater for the varying interests of the diverse groups of the profession and at the same time fairly hold the balance between these groups. Throughout all the years he held the post, first of editorial representative and latterly of editor, Mr. Brown was remarkably successful in maintaining friendly contact with all sections of the veterinary profession. Though a busy man with an eye on the clock, for he was meticulous in having his weekly copy ready in time for the press, Mr. Brown was always urbane and approachable.

For some it was unfortunate that his sanctum in 36, Gordon Square was situated at the top of two steep stairs, but perhaps, for the sake of Mr. Brown's work, it was as well that his eyrie was not too easy of access.

While one has the greatest respect for the Editorial Committees that have held office, in principle the method of dividing responsibility between a Committee and the Editor is at least open to criticism and the good relations that prevailed between the Committee and Mr. Brown are ample proof of the spirit of friendly co-operation that characterised his many years of devoted service to the profession.

Mr. Brown was punctilious in dealing with his correspondence and the reply forthcoming to a letter was always prompt and courteous; a valuable feature no less obvious in the other parts of the Association's offices.

Among his many activities on behalf of the Association there was one that perhaps never received the credit it deserved. Mr. Brown acted as Secretary of the Committee that produced the report on Small-animal Euthanasia. Whatever opinions may be held regarding the report, the work of the Secretary was well and truly done; the work was not light, it lasted for many months and was superimposed on the normally heavy task of producing *The Veterinary Record*.

Many like myself will wish to refer to the many little acts of personal kindness that they have experienced at Mr. Brown's hands. The Association were indeed fortunate in having, for so many years the loyal and devoted colleague that was to be found in Mr. Brown.

From the Hon. Secretary, Victoria Veterinary Benevolent Fund (Ladies' Guild).

It was a profound shock to learn of the passing of Mr. Brown. On every occasion that the Ladies' Guild required space in the *Record*, Mr. Brown provided it. Such requirements may have been of little consequence to many members of the profession, but were necessary if the ladies of the profession were to be informed of the work that was being carried on by the Guild. We are very grateful for Mr. Brown's wonderful help; we have lost a courteous, genuine friend who did everything he could to assist us.

He was known to his contemporaries as a man of many accomplishments, ever ready to assist all those who were associated with the veterinary profession; and his memory will ever be treasured by them.

To his widow and son goes our loving sympathy and thought at this trying time.

Major Andrew Spreull, D.S.O., T.D., M.R.C.V.S.

As briefly recorded in our last issue, Major Andrew Spreull died recently at the age of 76 years. He had been a veterinary surgeon in Dundee for over 50 years, having joined his father in practice when he qualified in 1902. He was awarded the D.S.O. in the first world war, and was twice mentioned in despatches. While a student he was middle-weight universities boxing champion, and he became later a well-known judge and referee, being President of the Scottish Amateur Boxing Association (1937-38).

He was appointed a Deputy Lieutenant for the County and City of Dundee in 1945. He retired from active practice a year ago.

Mr. Harry M. Wilson writes:

Major Spreull was undoubtedly one of Scotland's foremost veterinary surgeons—he was well known over a wide area as having an encyclopaedic knowledge of "Horse Practice"—and his opinions as a consultant were sought and valued. He was a popular figure with all classes of the community and many veterinary surgeons must be grateful for contact with "Andrew Spreull, of Dundee." The profession as a whole has lost one of its brightest stars.

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MEMORIAL TO THE LATE MR. S. J. MOTTON, M.R.C.V.S.

Subscriptions to this memorial fund now total some £280. It has been decided that the bulk of the fund shall be devoted to providing furniture for the committee room at the new headquarters of the Association, while the remainder will provide a cup for perpetual competition at the Royal Cornwall Show.

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VETERINARY FIELD STAFF

The Animal Health Division of the Ministry of Agriculture and Fisheries announce the following appointments to the permanent staff as Veterinary Officers:—

Mr. N. D. Baird, M.R.C.V.S., stationed at Carlisle;
Mr. D. F. Collings, M.R.C.V.S., stationed at Chelmsford;
Mr. M. Macaulay, B.SC., M.R.C.V.S., stationed at Inverness;
Mr. A. J. MacLeod, M.R.C.V.S., stationed at Chester;
Mr. D. Robertson, M.R.C.V.S., stationed at Dingwall;
Mr. W. B. Singleton, M.R.C.V.S., stationed at Carlisle, and
Mr. J. C. Wilson, M.R.C.V.S., stationed at Carmarthen.

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NEWSPAPER COMMENT

From time to time members of the Association are good enough to draw the attention of headquarters to reports or letters in the Press which are either inaccurate, unfairly critical of the profession or in other ways objectionable. Appropriate replies are sent to the newspapers concerned and are usually published in full. It will be appreciated how necessary such action is, and it would be extremely helpful if readers of *The Veterinary Record*, seeing matter in their local newspapers which calls for action on the part of the Association, would immediately send a dated cutting in order that a prompt reply may be made.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Ches.—Lane End Farm, Claylane, Haslington, Crewe (Jan. 9).
Cumberland.—Dickinson Place Farm, Allonby, Maryport (Jan. 5).
Lancs.—Eaves Green Hall, Goosnargh, Preston (Jan. 7); Mowbreck Hall Farm, Wesham, Kirkham, Preston (Jan. 8).
Northants.—Eaglethorpe Farm, Warmington, Peterborough (Jan. 6).
Staffs.—Billington Farm, Stafford (Jan. 5).

FOWL PEST:

Beds.—Three Counties Mental Hospital, Arlesey (Jan. 8).
Bucks.—17, Granville Avenue, Slough (Jan. 9).
Cards.—Pentowan, Mydroilyn (Jan. 9).
Cornwall.—Eodnervy Terrace, Carbis Bay, St. Ives (Jan 8).
Derbys.—1, Greer Lane Farm, Ford, Ridgeway (Jan. 7).
Essex.—66, Arnold Road, Dagenham (Jan. 9).
Glamorgan.—Blaenagwr Terrace, Nantymoel, Bridgend (Jan. 8); Maesteg House, Maescoed Road, Pontypridd (Jan. 9).
Hants.—Obleys, Brambridge, Eastleigh (Jan. 10).
Herts.—Horseshoe Farm. Barley, Royston; Homefield, Bedmond, Watford (Jan. 5); Newlands, Bedmond, Watford (Jan. 8).
Kent.—Broom Hill Farm, and Forge Farm Cottage, Southborough, Tunbridge Wells (Jan. 6); 23, Dane Park Road, Margate; Rosslyn, West Dumpton Road, Ramsgate (Jan. 9).
Lancs.—Mill House Farm, Croston, Preston (Jan 5); Railway View Farm, Golborne, Warrington (Jan. 7); 6, Bent Street, Blackburn; Sunnybank Nurseries, School Road, Marton, Blackpool (Jan. 8).
Leics.—Bancover Hickling Pastures, Melton Mowbray (Jan. 7).
Lincs.—Ivy Cottage, Tattishall Road, Woodhall Spa; Church Street, Heckington (Jan. 6); Gedney Road, Long Sutton, Holbeach (Jan. 7); Council Farm, Firsby, Spilsby; Rosedene, Peakes Lane, New Waltham, Grimsby (Jan. 8); Northope Road, Halton Holegate, Spilsby (Jan. 9).
London.—3, McDonald Road, N.19 (Jan. 10).
Middx.—Loudham Lodge, Polehill Road, Hillingdon (Jan. 8); 114, Kingsbury Road, N.W.4 (Jan. 10).
Monmouth.—9, Salisbury Terrace, Varteg, Pontypool; Myrtle Deri, Abergavenny (Jan. 9).
Norfolk.—6, Council Houses, Silt Road, Nordelph (Jan. 7); The Bungalow, North Tuddenham (Jan. 9); Pit Farm, Wereham, King's Lynn (Jan. 10).
Notts.—12, Cliff Drive, Radcliffe-on-Trent, Nottingham; Mill House, Walesby, Newark (Jan. 5); The Poplars, Bilsborough Road, Wollaton; 2, The Cottages, Bramcote Lane, Wollaton (Jan. 6); 124, Musters Road, West Bridgford; 13, Wilford Grove, Nottingham; Villa Farm, Bathley, Newark; 276, Southwell Road West, Mansfield, Manor Farm, Gamston, Retford (Jan. 1).
Oxon.—The Limes, Bladon, Woodstock (Jan. 9).
Pembroke.—Glandy, Dinas Cross, Newport (Jan. 9).
Staffs.—9, Dorset Road Terrace, Darlaston (Jan. 9).
Suffolk.—Ivydene, Bacton, Stowmarket (Jan. 8).
Surrey.—Woodland Farm, 155, Mytchett Road, Frimley Green, Aldershot (Jan. 5); The Retreat, Midde Hill, Englefield Green, Egham (Jan. 9).
Sussex.—Hill Farm, Blackboys, Uckfield (Jan. 8).
Yorks.—Inchfield Farm, Walsden, Todmorden (Jan. 8).

SWINE FEVER:

Cambs.—University Department of Veterinary Studies, Milton Road, Cambridge (Jan. 5).
Ches.—Northwoods, Audlem, Crewe (Jan. 6).
Devon.—Bayton Mill, Northcott Hamlets, Nr. Boyton, Launceston.
Essex.—Belmont Allotments, Castle Road, Grays (Jan. 5); Little Beldams Farm, Great Hallingbury (Jan. 7); Barville Farm, East Tilbury (Jan. 8).
Lincs.—Christians Yard, Sutterton (Jan. 5); The Piggeries, Benington, Boston (Jan. 8).
Norfolk.—Watton Road Allotments, Swaffham (Jan 6). Meadow Farm, West Winch, King's Lynn; The Kennels, Horsham St. Faith, Norwich (Jan. 8).
Salop.—Highfields Farm, Church Preen, Leebotwood, Shrewsbury (Jan. 8).
Suffolk.—Moss Farm, Worlingworth, Beccles (Jan. 5).
Surrey.—6, Smallholding, Wallington (Jan. 5).
Sussex.—Woodlands Farm, Catsfield, Battle (Jan. 8).

UNIVERSITY OF BRISTOL CENTAUR SOCIETY

The fourth annual dinner of the University of Bristol Centaur Society was held at the Victoria Rooms, Bristol, on Monday, December 7th, 1953.

The principal guest was Mr. G. N. Gould, a Past-President of the N.V.M.A. In proposing the toast of the Society he remarked that he thought that, in this year when Bristol graduates will be entering the profession for the first time, it was appropriate that the Society should have invited a practising clinician to be the guest of honour. The general practitioner was the backbone of the profession. Mr. Gould continued by suggesting that friendships formed in student days should be maintained. In addition, he advocated sustained contact with one's old college in order to keep abreast of modern developments in veterinary science.

Mr. R. V. Short, the student President, ably responded. The other speakers were Mr. D. N. Ryland (Hon. Secretary), who proposed "The Guests"; Professor A. Messervy (Hon. Vice-President) replied, and Mr. R. J. Thomas proposed "Absent Friends."

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Veterinary Surgeons Act, 1948

Election of Members of the Council of the Royal College of Veterinary Surgeons

In accordance with the Veterinary Surgeons Act, 1948, five members of the said Council, who must be members of the said Royal College, will be elected in 1954 by members of the Royal College residing outside the Republic of Ireland.

Five present members of Council will retire at the Annual General Meeting in 1954 and are eligible for re-election, namely:—

J. F. D. Tutt, Esq.,
Professor J. W. Emslie,
H. Holroyd, Esq.,
J. D. Peele, Esq.,
Miss J. O. Joshua.

Nominations of persons for election to the Council must be submitted in writing on a form which may be obtained from the undersigned, and which must be returned to him duly completed before *January 31st*, 1954.

Each such nomination form must bear the signature of the proposer and seconder, who must not be present members of Council, and must be countersigned by the nominee.

W. G. R. OATES, *Registrar*,
Veterinary Surgeons Acts, 1881-1948,
9, Red Lion Square,
London, W.C.1.

UNIVERSITY OF CAMBRIDGE

Examination for Vet. M.B., Part I

Michaelmas Term, 1953

List of Successful Candidates

Akester, A. R. (St. Catharine's College) (2, 3).
Gibson, I. G. (Downing College) (2, 3).
Hunt, M. D. N. (Christ's College) (1, 2, 3).
Kenchington, Miss F. (Newnham College) 1, 2, 3).
Parsons, Dr. U. (Girton College) (1, 2, 3).
Scratton, E. M. (Trinity Hall) (1, 2, 3).
*White, G. (St. John's College) (1, 2, 3).

*Special Merit.

(1) Animal Pathology and Bacteriology.
(2) Veterinary Parasitology.
(3) Animal Health and Production.

UNIVERSITY OF LONDON

Second Examination in Veterinary Science: December, 1953

(For Internal Students)

No successful candidate.

UNIVERSITY COLLEGE, DUBLIN, FACULTY OF VETERINARY MEDICINE

Examination Results

The following are amongst the recently announced results of examinations in the Faculty of Veterinary Medicine, University College, Dublin:—

Second Veterinary Medicine Examination

Second Class Honours—R. J. Teevan. *Pass*—T. Barnes, O. H. Cody, E. A. Costello, W. Cotter, D. J. Daly, Denise M. Ennis, G. A. J. Fallon, J. D. Hurley, T. J. Hurley, J. Moloney, P. J. Nolan, J. O'Driscoll, M. B. O'Hare, J. O'Mahony, D. C. O'Sullivan, P. J. O'Sullivan, M. A. Ryan.

Exempted from further examination in Part I (Anatomy)—T. A. Keane, J. Watkins.

Third Veterinary Medicine Examination

Pass—J. P. Clarke, J. J. Nolan, P. D. J. Stack.

Fourth Veterinary Medicine Examination

Pass—P. J. Fenlon, M. J. Flavin, W. Hally, P. Rhatigan, A. R. Tynan.

M.V.B. Degree

Pass—R. G. Cullen, W. Flanagan, J. Kelly, F. M. Mooney, P. D. Walsh.

Exempted from further examination in veterinary surgery and obstetrics—M. J. McGrath.

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EQUESTRIAN EVENTS AND THE NEXT OLYMPIC GAMES

Quarantine Creates "Demands for Removing the Games from Melbourne"

In its issue of Thursday of last week *The Times*, after announcing that Mr. Avery Brundage, President of the International Olympic Committee, had arrived in London on his way to Switzerland, a special meeting of the committee having been called for January 16th at Lausanne to discuss demands for removing the Games from Melbourne, quoted Mr. Brundage as saying that there were problems facing the committee which must be solved. "The Australian Government has imposed quarantine rules making impossible the holding of the 1956 Olympic equestrian events in Melbourne, but an Olympic rule states that all the Games, apart from the winter events, must be held in the same city. In the event of either of these rules not being relaxed the site for the Olympics would have to be changed.

"In spite of the difficulties in making ready for the Games in 1956," he went on, "18 cities, including Rome, Budapest and Lausanne, have offered sites for the Games. Seven American cities have already offered. I do not want to say any more on changing the site; but it is as yet undecided. At the meeting in Switzerland the agenda will be discussed and arrangements will be made for a full meeting in Athens in May."

A *Reuter* message from Chicago follows, recording that Mr. Lyman Bingham, Executive Director of the United States Olympic Committee, said that it might be possible to hold the equestrian events of the 1956 Games in Australia on a limited basis. Six nations could compete in the events, he said, in spite of the quarantine regulations. The Olympic rules permitted a sport to be contested with a minimum of six nations entered.

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FOOT-AND-MOUTH DISEASE IN SOUTH WALES

Mr. A. G. Beynon, South Wales Superintending Veterinary Officer of the Ministry of Agriculture, in a statement to the Press at Bargoed about the outbreak of foot-and-mouth disease in the area, said: "The Ministry take a serious view of the present disease position in view of the appearance of the disease at centres widely distributed throughout the area. The origin of infection in some of these cases can be attributed to the feeding of swill, but the sources of the other outbreaks have not so far been ascertained. The appearance of the disease at these widespread centres is indicative of some possible hidden sources of infection in the area."

The eighth outbreak in Glamorgan since November 8th had been confirmed among pigs belonging to Mr. W. G. Morris, of Hensol Farm, Pontyclun. Sixty-nine cattle, 113 sheep and nine pigs, the property of three owners who occupy holdings on the farm, were slaughtered. The number of animals destroyed in this series of outbreaks is 141 cattle, 2,690 sheep and 169 pigs.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

The indulgence of members is asked for any slight delay in dealing with communications addressed to this journal which may arise as a result of the untimely death of the Editor.

R.C.V.S. ANNUAL FEES

Sir,—Reference Mr. Shepherd's letter in your issue of December 26th, I should be interested to learn of the privileges of which he feels himself deprived.

When Mr. Shepherd chose to practise, he did so knowing that he was not academically qualified to practise veterinary surgery and medicine.

He has now been freed from the disadvantages of unqualified practice, and given the legal right to earn his living on an equality with those who have spent a not inconsiderable amount of time and money in studying to acquire the necessary scientific and professional knowledge to enable them to pass the statutory examinations. There is, however, one inequality—that of having received professional training and having given proof of a minimum standard of efficiency in the art and science of veterinary surgery and medicine by passing the requisite examinations. No enactment or payment of money can remove this inequality.

This age is characterised by the individual demanding his "rights" and all too often forgetting his obligations. I suggest Mr. Shepherd might well think less of his "rights" and consider himself a very privileged person in that the law has granted unto him the *right* to administer medical and surgical treatment to dumb creatures whilst denying it to those who are not now fortunate enough to be registered with the Royal College of Veterinary Surgeons.—Yours faithfully, Frederick Land, Woodford Green, Essex, *December 28th*, 1953.